

THE FALLING AGE OF PUBERTY IN U.S. GIRLS:

What We Know, What We Need to Know



INTRODUCTION

Girls today get their first periods, on average, a few months earlier than did girls 40 years ago, but they get their breasts one to two years earlier. Over the course of a few decades, the childhoods of U.S. girls have been significantly shortened.

What does this mean for girls today and their health in the future? We know that early puberty is a known risk factor for breast cancer and other mental and physical health problems. We need to better understand what's causing early puberty so that we can protect the health of our children now and as they age.

This companion guide to *The Falling Age of Puberty* report by Sandra Steingraber, Ph.D., highlights some key findings and recommendations.

THE PROBLEM

In recent years, there have been cases highlighted in the media of children entering puberty as young as age five. The onset of puberty—for both black and white girls—shows signs of a continuing decline as measured by the appearance of breasts (thelarche)



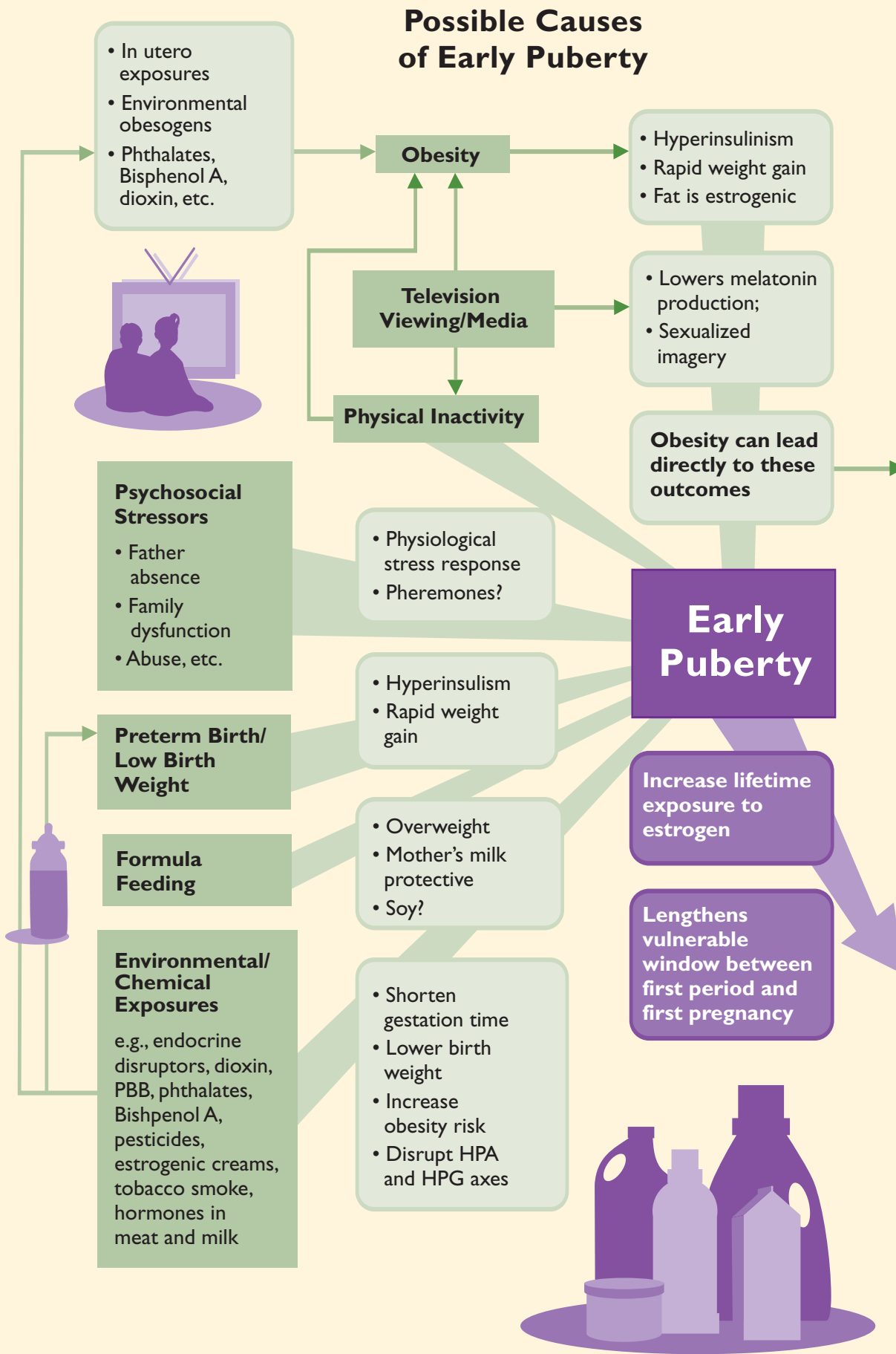
and pubic hair (pubarche).^{3,4} For example, in 1970, the average age of thelarche was 11.5 years. Thirty years later, it had fallen to just under 10 years for U.S. white girls and just under nine years for black girls, with a significant portion starting breast development before age eight.⁴

Studies have shown that the earlier girls enter puberty, the more likely they are to experience negative physical and mental health consequences. Some girls who mature earlier do not experience any of these negative outcomes, however.

EARLY PUBERTY HAS BEEN SHOWN TO RAISE THE RISK OF:

- Breast cancer
- Polycystic ovary syndrome
- High-risk behaviors in later adolescence like smoking, drinking, drugs, crime and unprotected sex
- Violent victimization
- Psychopathologies like depression and anxiety
- Conduct disorders and delinquency
- Lower academic education

Sandra Steingraber's
THE FALLING AGE OF PUBERTY IN U.S. GIRLS



Possible Consequences of Early Puberty*

- Depression
- Eating disorders
- Suicide attempts
- Early drug abuse
- Early alcohol abuse
- Physically and violently victimized
- Teenage sexual activity (possible teenage pregnancy)
- Conduct disorders/delinquency
- Lower academic education

Later Life Diseases

- Polycystic ovary syndrome

Breast Cancer

*This is a list of risk factors taken from the early puberty literature by studying girls at the population level. Many early maturing girls do not experience any of these negative mental and physical health outcomes.

WHAT DOES BREAST CANCER HAVE TO DO WITH EARLY PUBERTY?

The mission of the Breast Cancer Fund is to identify—and advocate for the elimination of—the environmental and other preventable causes of the disease. Early puberty is a known risk factor for breast cancer. The younger

First menstruation before age 12 raises breast cancer risk by 50% compared to menarche at age 16.²

girls are when they get their first periods, the greater their risk of breast cancer later in life. In fact, first menstruation (menarche) before age 12 raises breast cancer risk by 50 percent compared to menarche at age 16.² It is not completely clear how early

puberty increases breast cancer risk but there are some clues. We know that early puberty is associated with an increased exposure to estrogen (which raises breast cancer risk) and that early puberty expands the window of vulnerability for breast cancer development between first menstruation and first pregnancy. As an organization focused solely on identifying and eliminating the environmental links to the disease, the Breast Cancer Fund is especially concerned about synthetic chemicals that act like estrogen, which may be adding to lifetime exposure and contributing to an increased risk of breast cancer. We need to better understand the causes and effects of this relationship

and, as a community, ask the question: Is early puberty an inevitable phenomenon that is outside of our control and therefore a non-modifiable risk factor for breast cancer? Or, will greater understanding lead to interventions that can reverse this disturbing trend?

The Breast Cancer Fund commissioned *The Falling Age of Puberty* to answer this question and further examine the reasons for the declining age of puberty in U.S. girls. It reviews the published literature in a dozen fields of study and describes the state of the evidence for possible contributing factors and the mental and physical health consequences of early puberty.

POSSIBLE CONTRIBUTING FACTORS TO EARLY PUBERTY

Like breast cancer, early puberty is caused by a combination of factors. The interactions among these factors can be quite complex. As an example: We know that endocrine-disrupting chemicals are a possible cause of early puberty but we also know that exposure to these chemicals in utero or early in life can also lead to low birth weight and obesity, which are themselves possible causes of early puberty.

■ **Obesity:** Obesity disrupts the endocrine system and chubbier girls tend to reach puberty earlier. But, obesity is a consequence of early puberty as well as a possible contributor, adding to the complexity of studying this phenomenon.

■ **Endocrine-Disrupting Chemicals:** Exposures to endocrine-disrupting chemicals we come into contact with regularly are also playing a role in accelerating puberty in girls. These include chemicals we are commonly exposed to in cosmetics, shampoos, cleaning products, baby bottles and children's teething toys.

■ **Premature Birth and Low Birth Weight:** Both premature birth and low birth weight alter endocrine function and

therefore raise the risk of early pubarche. In addition to other factors, a pregnant woman's chemical exposures can directly affect her developing child, in some cases leading to premature birth and low birth weight.

■ **Psychosocial Stressors:** These stressors, including the absence of a father in the home and family dysfunction, also disrupt the endocrine system and are possible contributing factors to early puberty. The mechanisms behind these psychosocial stressors are not yet clear.

■ **Formula Feeding:** Breastfeeding appears to protect against early puberty in two ways: by contributing fewer calories than formula and by offering hormones and other growth factors that may protect against early puberty. Further study is

needed to clarify the role of breastmilk in pubertal development.

■ **Physical Inactivity:** Leanness and exercise together appear to protect against early puberty. While it is difficult to sort these two factors out in studies, there is enough evidence for us to take preventive action now.

■ **Television Viewing and Media Use:** Little is known about the effects of sexualized media content on pubertal timing in girls. But, increased time in front of the television or a computer can lead to obesity and physical inactivity, both factors directly contributing to early puberty. Additional research is needed to explore the mechanisms by which chemical signals in the brain may disrupt pubertal processes.

THREE KEY FINDINGS FROM THE REPORT

Fewer than 10 percent of breast cancers occur in women with a genetic history of the disease. Even when all traditional risk factors — including genetic predisposition, reproductive history, diet, exercise and alcohol — are aggregated, more than half of all breast cancer cases remain unexplained. A growing body of scientific evidence suggests that exposures to toxic chemicals in the environment are not only contributing to high breast cancer rates but also to the earlier arrival of puberty in girls. Here are three key findings that emerged from *The Falling Age of Puberty*.

1

Our children are not adequately protected from harmful chemical exposures.

Recent studies have shown that the amount of natural hormones that a child produces is much less than previous research showed. This changes how we think about the potential impact of a synthetic chemical in a child's

body: even a tiny amount could have a huge impact if, for example, the amount of synthetic chemical is roughly the same as the amount of the naturally occurring hormones. This has implications for setting safe levels of chemical exposures for our children. The report describes puberty as a delicate process that is inherently susceptible to disruption. To stop early puberty we need public health protections that protect the most vulnerable—our children—from harmful chemical exposures and err on the side of precaution.

2

Early puberty is hitting some girls harder than others.

All of the possible causes of early puberty discussed in the report — obesity, television viewing, physical inactivity, psychosocial stressors, low birth weight,

formula feeding and chemical exposures — hit poorer communities and communities of color the hardest. These are communities where poverty, racism, unemployment and exposure to toxic substances are high and access to nourishing food and safe places to exercise is low. As report author Sandra Steingraber noted, "...early puberty is not only a women's issue (because it disproportionately affects girls) but it is a class and race issue as well." To address this disparity, we need interventions and responses to early puberty that acknowledge that low-income, overweight, girls of color are most at risk.

3

We need to reach beyond our own communities and work together to address the falling age of puberty.

Breast cancer prevention advocates need to work closely with colleagues in children's health, women's health, and environmental health and build

new collaborations with specialists working on the nutritional, behavioral and psychosocial contributors to early puberty. As the report states, "The problem with problems that cross multiple environmental media is that they fall between regulatory and activist cracks. On the one hand, addressing all the root causes simultaneously raises the risk for programmatic and regulatory fragmentation and leads to inertia. On the other hand, addressing one problem at a time does not begin to unknot the tangle of its interrelated causes."

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WHAT WE CAN DO ABOUT THE FALLING AGE OF PUBERTY

What We Need to Know. There are areas of research that need to be supported to fill the holes in the science of early puberty. These include:

Basic Science – There are important areas of scientific exploration that need to be addressed for us to better understand early puberty. These include exploring the mechanism behind the initiation of puberty, the role of signaling devices like hormones and enzymes, the impact of chemical exposure during pregnancy and the effect of breastfeeding on endocrine system development.

Epidemiology – We need large studies that follow girls from conception to adulthood like the National Children’s Study, mandated by Congress in 2000 but not yet fully funded. Studies like those in the National Institute of Environmental Health Sciences and National Cancer Institute-funded Breast Cancer and Environment Research Centers will contribute to our understanding of obesity and pubertal onset but also need to look at the role of endocrine-disrupting chemicals.

Chemical Testing – Chemicals are not tested for their ability to disrupt the endocrine system before they are allowed into the marketplace. The Environmental Protection Agency’s Endocrine Disruptor Screening Program, mandated by Congress, is eight years behind schedule and not one chemical has been screened to date. We need this screening information in order to reduce the public’s exposure to these chemicals.

Chemical Tracking – We also need to know more about the sources, emissions and fate of endocrine-disrupting chemicals in commercial use in order to reduce exposures. We need full disclosure of ingredients in consumer products, especially children’s products. We need more complete inventories of emissions and better monitoring of air, food and drinking water. The Toxic Release Inventory was one good example of chemical tracking but it has been significantly weakened.

Biomonitoring – Biomonitoring, or measuring the pollution in people, helps prioritize research on emerging chemicals of concern by identifying which chemicals are in our bodies. While the U.S. Centers

for Disease Control and Prevention (CDC) biomonitor a national sample of the population for chemical contaminants, it collects very little information on infants and children and cannot be disaggregated in a way that would give us a snapshot of chemical exposures at the state or local level. The California Environmental Contaminants Biomonitoring Program will address some of these gaps and build a replicable model for other states interested in creating their own statewide biomonitoring programs.

What We Can Do Now.

There is enough evidence of direct and indirect contributing factors for us to take action now to prevent early puberty. These include:

- Combat childhood obesity by promoting breastfeeding early in life and supporting school-based healthy school lunch and obesity prevention programs for older children.
- Support efforts to improve access to healthy foods in urban, low-income areas through the creation of farmers’ markets and community gardens.¹
- Eliminate fetal exposures to toxic chemicals in our everyday lives like tobacco smoke, chemical solvents and mercury.
- Support a ban of endocrine-disrupting chemicals such as bisphenol A in baby bottles and phthalates in children’s teething toys.
- Support organic agriculture at home and in schools to reduce exposure to hormonally-active pesticide residues, animal hormones and antibiotics, and to protect watersheds from contamination.

BREAST CANCER FUND RECOMMENDATIONS

The Falling Age of Puberty provides a clear call to action for comprehensive public education, corporate accountability campaigns and legislative advocacy efforts. In addition to fully supporting the author's recommendations inside, the Breast Cancer Fund also advocates for:

Innovative Policy Solutions. Of the possible causes of early puberty, some can begin to be addressed with public education and public health interventions. For other possible causes—like chemical exposures, low birth weight and obesity—broader, innovative policy solutions are required at the state and federal levels.

Chemical Policy Reform. In the United States, government regulations do not adequately protect us from radiation and harmful chemicals in the environment and in the products we use. We need to reform chemicals policy at the state and federal levels. The Breast Cancer Fund is active in

broad-based coalition efforts to strengthen the regulation of chemicals in California and across the country.

Corporate Accountability. The Breast Cancer Fund is committed to eliminating environmental exposures to carcinogenic and endocrine-disrupting chemicals—many that mimic estrogen in the body and can contribute to early puberty—through corporate accountability campaigns. As we have seen through the Campaign for Safe Cosmetics, companies can be a part of the solution and consumers can help move the market by focusing their purchasing power on non-toxic products. Visit www.safecosmetics.org for more information.

WHAT YOU CAN DO PERSONALLY AND POLITICALLY

Tell your state representatives that healthy children become healthy adults and deserve our protection. Support state legislation that reduces children's exposure to chemical contaminants, like California's efforts to ban toxic chemicals from baby bottles and children's toys. To see more examples and get active in your state, visit www.breastcancerfund.org/toolkit

Insist that the federal government invest in our children's health. There is important work that needs to move forward for us to better understand how early life exposures can lead to early puberty, later-life breast cancer and other diseases. The National Children's Study is just one example. Tell your representatives to support these efforts and invest in public health programs that will prevent disease, not just treat it.

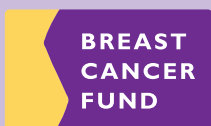
Be an informed consumer. Whenever possible, purchase products made from safe alternatives to harmful chemicals. You will be protecting the quality of our air and water, the health of your family and the health of future generations. To find safe personal care products,

visit www.cosmeticdatabase.org. See how easy, everyday actions can reduce breast cancer risk at www.pureprevention.org.

Protect the ones you love. Be sure that the children, parents and pregnant women in your life know that chemicals found in household products and personal care products can disrupt the endocrine system during critical stages of development and contribute to the early onset of puberty, among other health problems. For more information on creating a healthy home, visit www.healthychild.org.

Get active in your community. It will take all of us working together to address the possible causes of early puberty—there is plenty for each of us to do. The Breast Cancer Fund focuses on eliminating chemicals linked to breast cancer (www.breastcancerfund.org), others are advocating for more breastfeeding (www.safemilk.org) and still others are pushing for more physical activity for kids in schools (www.healthyschools.org). How will you be a part of the solution?

¹ Foxhall K, "Beginning to Begin: Reports from the Battle on Obesity," *American Journal of Public Health* 96 (2006): 2106-2112. ² Grumbach MM and Styne DM, "Puberty: Ontogeny, Neuroendocrinology, Physiology, and Disorders," in Larsen PR et al., eds., *Williams' Textbook of Endocrinology*, 10th ed. (Philadelphia: Saunders, 2003), pp. 1115-1286. ³ Muir A, "Precocious Puberty," *Pediatrics in Review* 27 (2006): 373-81. ⁴ Parent AS et al., "The Timing of Normal Puberty and the Age Limits of Sexual Precocity: Variations Around the World, Secular Trends, and Changes after Migration," *Endocrine Reviews* 24 (2003): 668-693.



PREVENTION STARTS HERE.
www.breastcancerfund.org

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